UNITED STATES DEPARTMENT OF AGRICULTURE

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in cooperation with

OREGON STATE COLLEGE
UNIVERSITY OF CALIFORNIA
WASHINGTON STATE COLLEGE

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OUTLOOK FOR HOPS

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- - -

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FOREWORD

The study on which this report is based was undertaken at the request of the United States Hop Growers Association. Increased wartime production and new plantings seemed to indicate a probable postwar increase in hop production under conditions of a decreasing market demand. An appraisal of this situation, in the light of all available information, was desired.

The Bureau of Agricultural Economics and the Agricultural Experiment Stations of Oregon State College, the University of California, and Washington State College cooperated in the assembly and analysis of the data here presented. In addition to those listed as authors of the report, H. R. Wellman, Director of the Giannini Foundation of the University of California, and Mark T. Buchanan, Head of the Department of Farm Management and Agricultural Economics, Washington State College, assisted in the study by reviewing outlines and the report, and by making suggestions. The statistical unit of the Giannini Foundation, under the direction of Mrs. Dorothy B. Erdahl, assembled the data used in this report from various published sources. The helpful suggestions of E. L. Markell, Secretary of the United States Hop Growers Association, Paul Rowell, Secretary-Manager of the Hop Control Board, and others in the industry are gratefully acknowledged.

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SUMMARY

The essential facts of this report follow:

Relating to Production

1. There is considerable fluctuation in the acreage of hops harvested each year. The acreage harvested in the pre-prohibition year of 1916 was 38,900; in 1923 during prohibition the acreage had dropped to 18,440 acres. Subsequently the trend of harvestings has been upward, having reached a peak of 40,600 acres in 1945, with the possibility of a further acreage increase until 1948 if price conditions continue to be relatively favorable to the grower.

2. Growers can affect the output of hops for one season without permanently removing the yards from production. Some growers will let their yards lie idle for a season; others will not harvest their crop because of unfavorable prices at harvest time.

3. New plantings of hops have occurred in each of the three commercially significant producing States - Oregon, Washington, and California. The highest percentage increase in acreage occurred in Washington where acreage yields are highest. Furthermore, Washington produced more hops during 1943 and 1945 than either Oregon or California, and in addition approximately two-thirds of its output is of very low seed content.

4. The low hop yields per acre in Oregon reflect the use of poorer soil, a lack of irrigation, and losses from disease and insects. On those farms where low yields are accompanied by high unit production costs, any lowering of hop prices will be especially influential in regard to future operations.

5. Mechanization of the harvesting operations in the industry is proceeding without undue disturbance in the labor balance in the hop-producing areas. If a complete mechanization of picking operations is effected, it will mean a higher capital investment in yards and equipment and a higher overhead expense for the operators, although the unit cost for picking might be reduced.

6. Further increases in fixed overhead, caused by higher capital investments, will affect materially the decision of operators to harvest or not to harvest their annual crops. As a factor in the supply, the mechanization of harvesting and resulting fixed overhead charges could be especially significant as they relate to annual output.

7. Wartime prices have been sufficiently high to induce old growers to expand their acreage and new growers to plant hops. The full effects of the new plantings will not be felt until 1947; it is conceivable that at that time an output of more than 60 million pounds of

hops may be produced domestically. This production would exceed the 1945 output by about 4 million pounds. Since farmers are not limited by a supply of suitable land for planting hops, their response to a favorable price situation is always a potential market factor.

Relating to Consumption

1. Approximately 98 percent of all hops grown in the United States are used in the manufacture of beer and ale.

2. Beer consumption in the United States increased by more than 90 percent between 1935 and 1944, but the consumption of hops in the manufacture of beer increased less than 17 percent. This disproportionate increase of beer manufacture in relation to hops used in its manufacture was due to a change in the hops-beer ratio from .702 pound of hops per barrel of beer to .43 pound.

3. Available information indicates a present consumer preference for beer with a low hop content. During the war, the hop content of beer was reduced somewhat because of the shortage of malt.

4. The probable upper limit of beer manufacture, at the most likely hops-beer ratio, would require considerably fewer hops than were produced in 1944 or 1945. Even if the hops-beer ratio should reach .5 pound of hops per barrel of beer, the amount of hops required to produce 80 million barrels would be 15 million pounds below the estimated 1945 hops production.

5. Beer production tends to rise and fall with national income; in fact, beer consumption increased approximately 6 gallons per capita, or from approximately 13 to approximately 19 gallons per capita, between 1940 and 1945. Unless consumer purchasing power is maintained close to the wartime level, per capita beer consumption is likely to decline.

6. The conclusion of the authors is that the potential consumption of beer will not be sufficient to absorb in domestic markets the potential output of domestic hops.

Relating to Foreign Trade

1. Any forecast relative to the foreign demand for American hops beyond the next 2 or 3 years is hazardous. During those immediate postwar years, a moderately large volume of hops will probably be exported from the United States. Examination of the statistics leads the authors to the conclusion that it is probable that hop exports from the United States will no more than equal imports after 2 or 3 years, and it is quite possible for a heavy net import balance to develop unless the quality of domestic hops is greatly improved.

Relating to Hop Prices

1. Any maladjustment of the supply and demand for hops is reflected in the carry-over. Since the demand of the breweries for hops is only slightly elastic from the standpoint of varying the hops-beer ratio in response to price changes, any abnormal inventory results in a weakening of the growers' bargaining position and lower prices. There is some indication, however, that a demand for storage to rebuild depleted inventories would arise if there should be a material decrease in hop prices.

2. Growers tend to leave some of their hops unharvested if contract prices are not satisfactory, thereby exercising some measure of control over the carry-over for the following year.

3. Unless there is an abnormal increase in beer consumption, and an unusually high net export trade in hops, and a material increase in the hops-beer ratio, or a crop failure, the potential annual supply of hops after 1945 will probably exceed the annual demand by several million pounds.

4. Hop growers face some real problems after 1946 or 1947. It is quite likely that prices will not prove satisfactory to growers because of the serious unbalance between prospective demand and prospective supply. This prospective maladjustment between supply and demand should be of special concern to hop growers.

5. Inadequate information relative to the inventories of hops in the hands of dealers has proved a disturbing factor in the market. Reliable information, if made available currently, as was the case while the Hop Control Board was operating, would promote a greater degree of price stability.

6. The development of uniform standards for grading hops, which has been in progress at Oregon State College, and putting them into use should do much to eliminate some of the unaccountable price variations that have occurred in the past. Grading by such standards would be of material assistance in stabilizing market conditions.

OUTLOOK FOR HOPS

by Marion Clawson 1/ and D. B. DeLoach 2/

PRODUCTION OF HOPS IN THE UNITED STATES

Acreage

Hop production has moved westward over the past 50 years. New York was the leading hop producing State in 1899; it had half of the total acreage (table 1). By 1909, acreage there had declined by half; and by 1919, New York was no longer a major hop-producing State. On the Pacific Coast, Oregon has been the leading State most of the time. The relative position of Oregon first, California second, and Washington third in acreage has existed throughout, with only minor exceptions.

The year-to-year changes in acreage are more revealing, especially for recent years (figure 1 and table 7. p. 30). In the period preceding pre-World War I, hop acreage was fairly steady for several years at 40,000 to 45,000 acres. A sharp decline in acreage occurred in 1917, and from 1917 to 1932 acreage varied from 18,000 to 27,000. The sharp decline in acreage in 1917 was nearly 2 years ahead of the wartime national prohibition. Several states had previously passed "local option" laws prohibiting the sale of alcoholic beverages, which undoubtedly reduced the demand for hops. The probability of national prohibition may have been a one cause of the reduction of acreage before the actual initiation of prohibition.

Acreage of hops harvested rose sharply in 1933 and again in 1934, which probably means that plantings were made in 1933. This increase in acreage somewhat anticipated the removal of beer from the intoxicating-beverage class, which occurred in March 1933, and the later repeal of the prohibition law in December 1933. Hop acreage reached a peak of nearly 40,000 acres in 1935, and then declined slightly. During the 1936-43 period, the acreage of hops harvested was fairly stable, at 31,000 to 35,000 acres. In 1944 and 1945, harvested acreage rose - in the latter year, to a figure higher than any since 1916. Harvested acreage is likely to rise in 1946 and 1947 and perhaps in 1948 if prices are satisfactory to the growers. The year-to-year changes in acreage suggest the possibility of cycles of over- and under-planting.

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Table 1. - Acreage of hops in leading states in the United States, Census Years, 1899 to 1939 1/

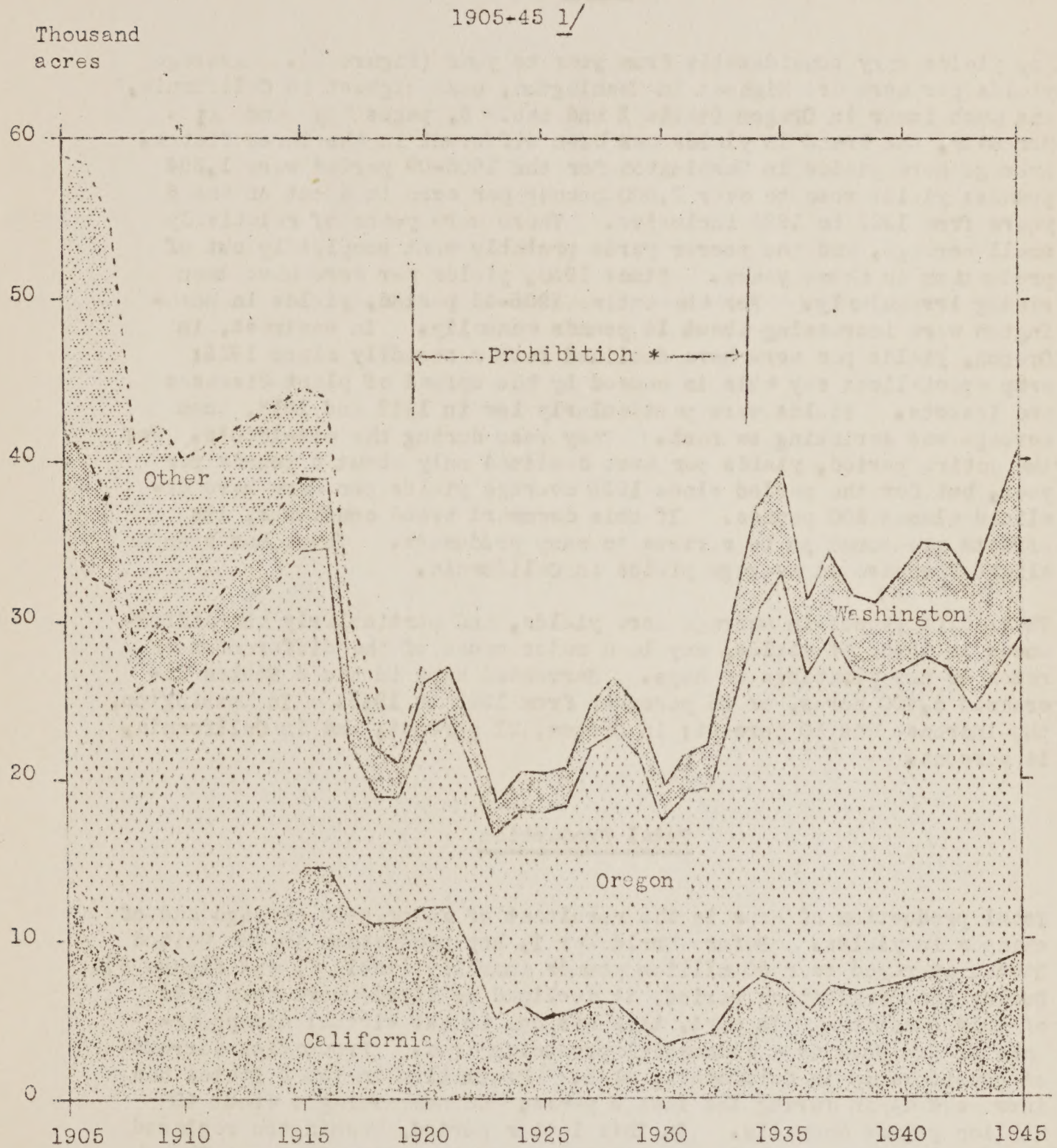
Year	Oregon	Washington	California	New York	Wisconsin	All other states	United States
	Acres	Acres	Acres	Acres	Acres	Acres	Acres
1899	15,433	5,296	6,890	27,532	342	120	55,613
1909	21,770	2,433	8,391	12,023	30	46	44,693
1919	5,629	1,129	8,118	1,024	-	54	15,954
1929	16,327	2,814	4,144	17	-	-	23,302
1939	18,649	4,665	6,354	185	-	96	29,949

1/ For estimates of acreage harvested annually, see table 7. p. 30.

Sources: 1899 - 12 th Census of the United States, Vol. VI, Part II, page 594; 1909 - 13th Census of the United States, Vol. V, page 699; 1919 - 14th Census of the United States, Vol. V, page 850; 1929 - 15th Census of the United States, Agriculture Vol. IV, page 824; 1939 - 16th Census of the United States, Agriculture Vol. III, page 795.

Figure 1. - Acreage of hops harvested, by States,

1905-45 1/



1/ Estimated acreages prior to 1915.

* Including wartime prohibition against use of grain for alcoholic beverages.

Yield

Hop yields vary considerably from year to year (figure 2). Average yields per acre are highest in Washington, next highest in California, and much lower in Oregon (table 2 and table 8, pages 9 and 31 . Moreover, the trend in yields has been different in the three States. Average acre yields in Washington for the 1905-09 period were 1,384 pounds; yields rose to over 2,000 pounds per acre in 4 out of the 6 years from 1923 to 1928 inclusive. These were years of relatively small acreage, and the poorer yards probably went completely out of production in those years. Since 1930, yields per acre have been rising irregularly. For the entire 1905-45 period, yields in Washington were increasing about 14 pounds annually. In contrast, in Oregon, yields per acre have declined rather steadily since 1925; crop specialists say this is caused by the spread of plant diseases and insects. Yields were particularly low in 1917 and 1918, when acreage was shrinking so fast. They rose during the mid-1920's. For the entire period, yields per acre declined only about 2 pounds per year, but for the period since 1925 average yields per acre have declined almost 300 pounds. If this downward trend continues, its effects are bound to be serious to many producers. There has been a slight increase in average yields in California.

These differences in average acre yields, and particularly the differences in trend of yields, may be a major cause of the differences in rates of new plantings of hops. Harvested hops in the 3 States increased 8,400 acres, or 26 percent, from 1943 to 1945. In Washington, the increase was 50 percent; in Oregon, 21 percent, and in California, 14 percent.

Total Production

Total production of hops is the resultant of changes in acreage and of changes in yields. Before World War I, hop production in the United States averaged over 50 million pounds annually (table 3, and figure 3). During the prohibition period, it declined to little more than half of this quantity. In part, this was due to the virtual disappearance of New York as a commercial producing area. Production decreased considerably in California, also. Production in the 3 States has increased again during the last 5 years, and now averages about 40 million pounds annually. In this latter period, Washington replaced California as the second most important hop-producing State. Though Washington acreage did not exceed California's in most of those years, higher yields in Washington resulted in a larger total production for the period. In 1943 and 1945, Washington surpassed Oregon also in total hop production, becoming for the first time the leading hop-producing State.

Figure 2. - Yield of hops per acre, by States,

1905-45

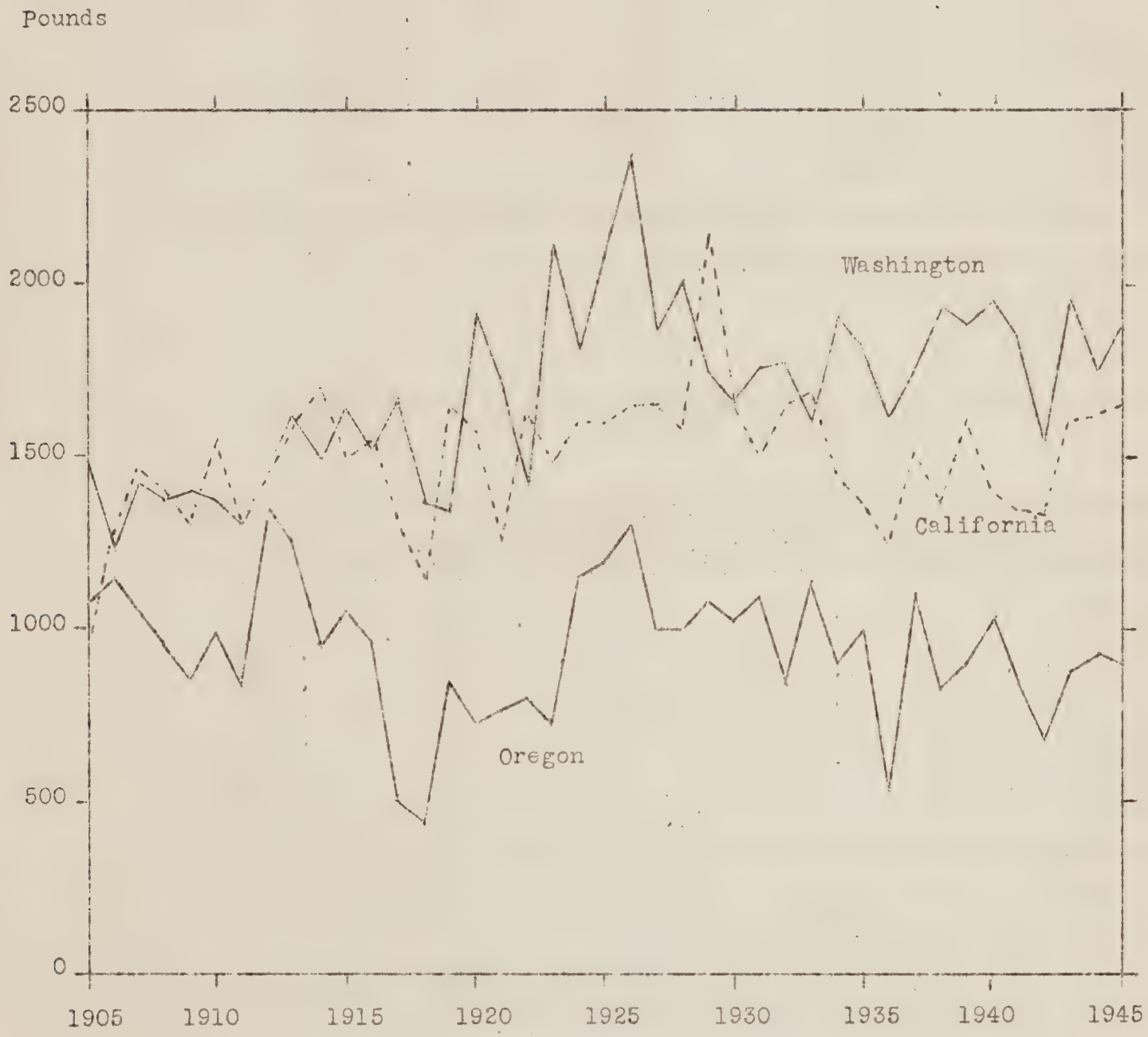


Table 2. - Average yield of hops per acre, by 5-year periods, and by States, 1905-09 to 1940-44

(pounds)

Period	Average yield per acre in Washington	Oregon	California
1905-09	1,384	1,014	1,281
1910-14	1,443	1,073	1,520
1915-19	1,506	757	1,430
1920-24	1,792	833	1,509
1925-29	2,027	1,116	1,726
1930-34	1,740	999	1,588
1935-39	1,802	870	1,422
1940-44	1,812	872	1,460

Source: Based on date in table 9, p. 33.

Table 3. - Average annual production of hops, by 5-year periods, and by States, 1905-09 to 1940-44

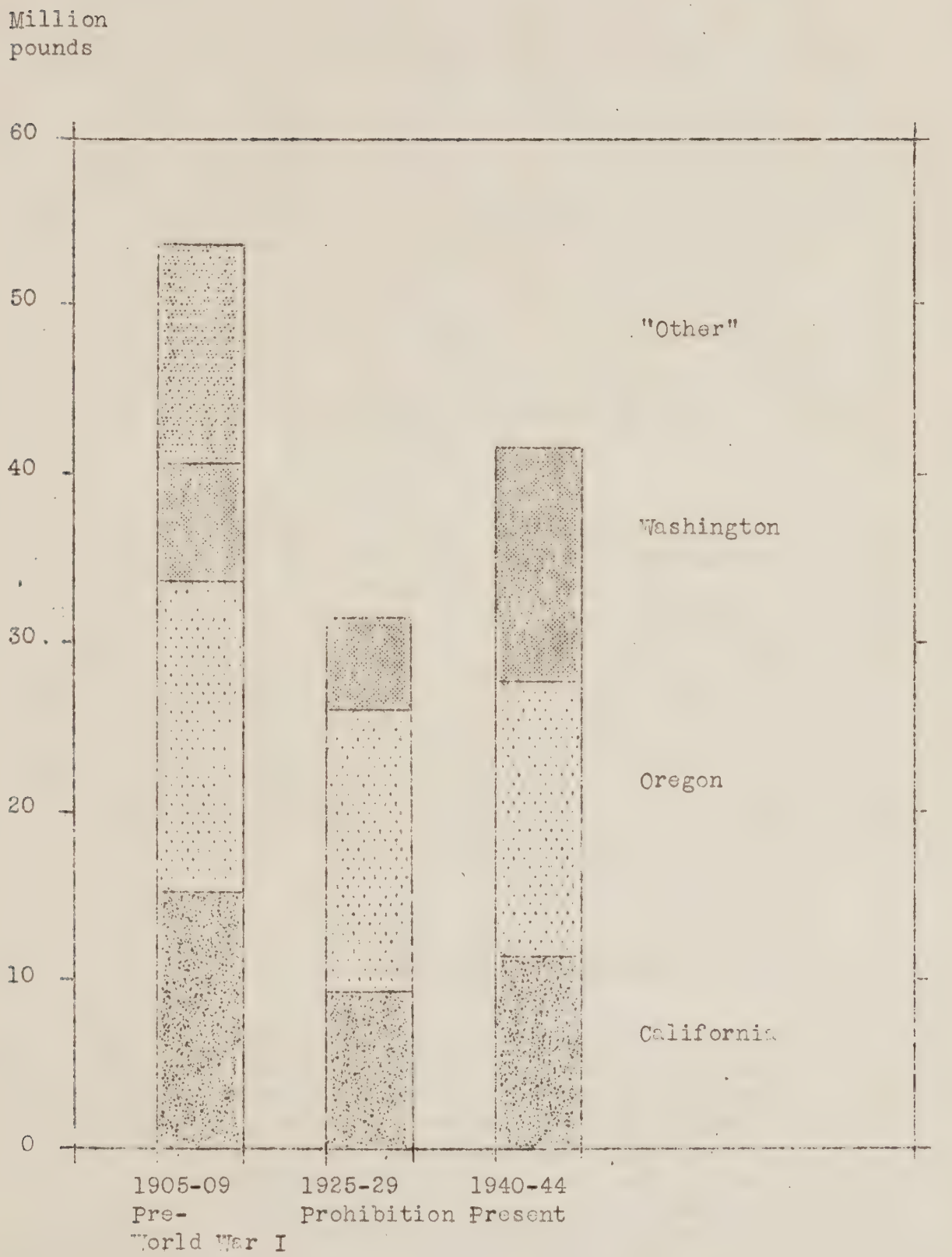
(Million pounds)

Period	Average annual production in Washington	Oregon	California	Other	Total
1905-09	6.3	20.0	14.0	9.5	1/ 53.6
1910-14	2/	2/	2/	2/	52.2
1915-19	5.4	11.1	18.0	2.1	36.6
1920-24	4.5	9.8	13.1	3/	27.6
1925-29	5.4	16.8	9.2	4/	31.4
1930-34	6.4	17.3	7.9	4/	31.6
1935-39	9.2	19.0	9.5	4/	37.7
1940-44	13.8	16.4	11.3	4/	41.5

1/ This figure obtained from later sources than state figures, and does not check exactly.
2/ Data not available by states.
3/ Data available only for 1920; total does not check exactly because it includes production in other states for 1920.
4/ Data not available.

Sources: See table 8, p. 31.

Figure 3. - Average annual hop production for selected 5-year periods, by States



There has been a considerable year to year variation in hop production (figure 4 and table 9, p. 33). There are occasional years of unusually high production. More important, from the viewpoint of the brewing industry, are the years of unusually low production. As long as years of low production may occur, the industry needs to maintain substantial stocks in order to avoid a shortage of suitable hops.

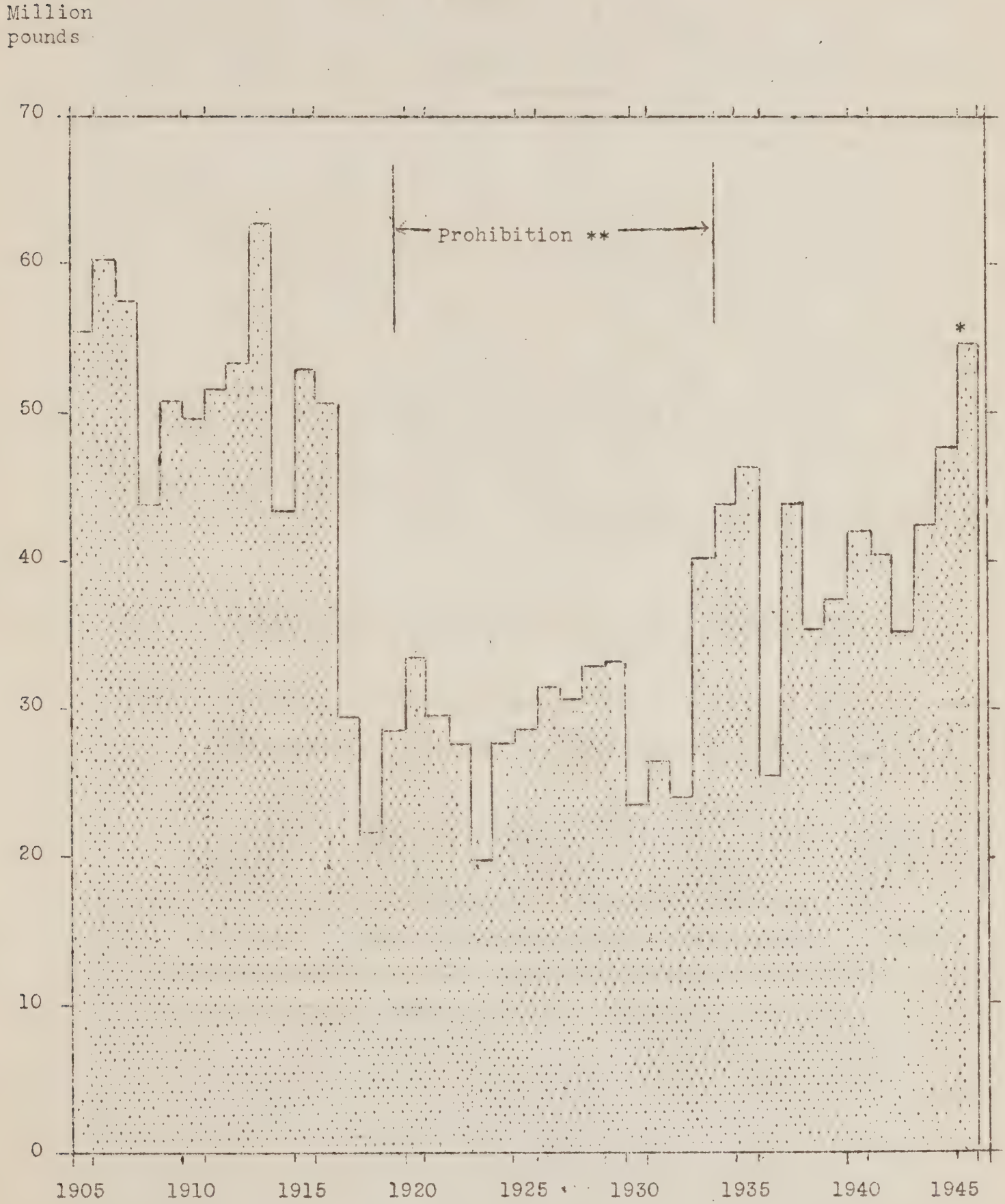
Because of a combination of expanding acreage and fairly good yields, production increased by about 5 million pounds each year from 1942 to 1945. In the latter year, production was higher than in any year since 1913, and was at the general level prevailing before World War I. Acreage now is lower than in the former period, but acre yields are somewhat higher, so the total production is about the same. Hops planted in the last year or two are not yet in full bearing, so production has probably not reached its maximum from the present acreage. If additional plantings are made in the next year or two, and if proper cropping practices are used to improve yields, total production of hops could reach a new high within the next 5 years.

Hop-picking machines, are not new, but they have been used more extensively during the war than previously. Field as well as stationary machines have been used. Machines probably lower the cost of picking, although data on average costs by hand and by machine are not available. Another factor to consider is the effect of machine-picking upon yield and quality of hops, but information is not available on these points. Hops picked by hand and by machine during the war have contained more stems and leaves than normally, because laborers were unwilling to pick clean under fixed picking rates. This may have an effect upon hop prices, as will be shown later. A fuller mechanization of harvesting operations will increase the capital investment in equipment and yards, thereby raising fixed costs to a point where they will induce some operators to continue producing and picking hops in order to cover their fixed charges and minimize their losses.

Outlook for Production

The 26 percent increase in acreage of hops harvested, from 1943 to 1945, has been noted. As nearly as can be ascertained, there was practically no abandonment of hop yards during these years. The increase in harvested acreage in 1944 and 1945, therefore, largely reflects new plantings in 1943, 1944, and 1945. In addition, part of the new plantings made in 1945 were probably not included in the estimate of harvested acreage for 1945. The price of hops during the war years has been relatively favorable to producers. The average farm price of hops for 1935-39 was 19.5 cents per pound; in 1942 it was 45.2 cents, or 132 percent above 1935-39; in 1943, 62.2 cents, or 219 percent above 1935-39; and in 1944, 64.6 cents, or 231 percent above 1935-39. Costs had risen during these years. However, the national index of prices paid by farmers for all commodities bought

Figure 4. - Annual production of hops in the United States, 1905-45



* As indicated

** Including wartime prohibition against use of grain for alcoholic beverages.

had risen from 1935-39 by only 22 percent in 1942, 34 percent in 1943, and 41 percent in 1944. On the other hand farm wages without board for the Pacific Coast had risen from the 1935-39 average by 87 percent in 1942, 154 percent in 1943, and 186 percent in 1944. While hops require more farm labor than many farm products, considering all available facts it appears that hop production in these years was relatively profitable, which is probably a major reason for the expansion in acreage which took place.

Another major cause of this increase was the extensive wartime use of two and three year contracts. On April 1, 1945 contracts with growers covered over 35 million pounds, or 65 percent of the production that year (table 4). An approximately equal volume was under contract on this date, for delivery in 1946, and substantial tonnage was also contracted for delivery in 1947 and 1948. These contracts had varying provisions about prices. In general, it was specified that prices paid would not exceed any price ceilings that might be established by the Government. Subject to that limitation, prices for 1945 delivery averaged about 65 cents per pound; for 1946 delivery, about 55 cents; and for 1947 delivery, about 45 cents. The lower prices in the later years were based on the assumption that production costs would decline after the war. With the prospect for profitable prices which these contracts offered, a grower might establish a yard and recover a good share of his investment within a year or two.

Table 4. - Quantities from future crops that hop growers have contracted to sell to handlers, as of April 1, 1945 1/

State	1945	1946	1947	1948
	pounds	pounds	pounds	pounds
Oregon	14,139,312	14,129,068	6,460,468	5,800,000
California	12,108,135	11,657,500	2,503,000	1,962,000
Washington	9,090,023	9,020,323	2,661,023	1,371,000
Idaho	180,000	295,000	200,000	200,000
Total	35,517,470	35,101,891	11,824,491	9,333,000

1/ Future contracts made between growers and dealers (handlers) at specific market prices.

Source: Hop Control Board.

The 8,400 acre increase in harvested acreage from 1943 through 1945 was due to plantings in 1943, 1944, and 1945. It is impossible to predict what will be planted in 1946 and later years, but further

plantings of 1,000 to 3,000 acres in the four western States combined are not improbable if the normal response of growers to favorable prices continues to govern their actions. These could easily raise harvested acreage to 42,000 to 44,000 by 1947 or 1948. As pointed out, a large part (46 percent of the increase in acreage from 1943 to 1945) of the increased acreage is in Washington, where acre yields are highest. With the higher yields and upward trend in yields in that State, and a possible increase in acreage yields in Oregon due to irrigation and the control of disease and insects, average acre yields of hops for the whole region might increase as much as 5 percent in the next 3 years, as contrasted with yields in the 1943-45 period. This increase in average yields plus the probable further increase in acreage might lead to a total production of 60 million pounds, or even more. A crop of this magnitude has not been achieved in the United States since pre-prohibition years.

There are obviously some uncertainties as to future hop production, but it seems fairly clear that production will be very large in comparison with that since the repeal of the prohibition law. The possible outlets of such production, either through domestic consumption or export, are considered in the following sections of the report.

Another potential force that might cause a further unbalancing of hops supply and demand is the fact that there is a large acreage of land in the United States suitably located for hops production. For this reason the price of hops in relation to the price of other crops, rather than the limitation of land, becomes one of the principal factors determining the extent of grower plantings.

CONSUMPTION OF HOPS

Approximately 98 percent of the hops consumed in the United States normally are used in making beer and ale, and 2 percent are sold to the bakery trade and for the manufacture of pharmaceutical products. Since a major part of the hops is used in the preparation of an alcoholic beverage subject to a Federal excise tax, the statistics assembled by the Bureau of Internal Revenue for administration purposes constitute a fairly reliable source of information on the consumption of hops.

The consumption of hops by breweries is shown in table 10,(p. 35)... The relatively heavy consumption by breweries before 1917 is explained by the high hops-beer ratio rather than by an exceptionally high per capita consumption of beer. Beer manufacturers anticipated a resumption of former drinking habits with the repeal of prohibition, and began to manufacture and sell beer containing .702 pound of hops per barrel. It became obvious that the tastes of the new generation of consumers were different from those of the pre-prohibition consumers. The adjustments that took place to satisfy the new kind of consumer demand are reflected in table 5.

Table 5. - Beer production, hop consumption by breweries and ratio of hops to beer, 1934-35 to 1944-45

Year July 1 to June 30	Production 1/	Hop and hop extract used	Pounds per barrel
	barrels - 31 gal.	pounds	
1934-35	45,228,605	31,772,887	.702
1935-36	51,812,062	34,516,246	.666
1936-37	58,748,087	37,004,749	.629
1937-38	56,340,163	34,874,575	.619
1938-39	53,870,553	32,462,163	.6026
1939-40	54,891,737	31,926,866	.5816
1940-41	55,213,850	31,154,676	.5643
1941-42	63,649,483	34,509,072	.542
1942-43	71,018,257	34,701,474	.488
1943-44	81,651,469	36,137,992	.4426
* 1944-45	86,246,657	37,042,939	.4295

* Preliminary
Source: Hop Control Board Reports.

1/ Total beer production; later tables use beer consumption based upon tax-paid withdrawals of beer.

Beer consumption has increased more than 90 percent between 1934-35 and 1944-45, but brewers used only 16.6 percent more hops to manufacture beer in 1944-45 than they did 10 years before. In other words, where 1 barrel of beer required an average of .702 pound of hops in 1934-35, only .43 pound was used in 1944-45. This reduction might have been due in part to the need of maintaining a balance between hops and malt, as the supply of malt was inadequate during the war period. Available statistics show that the hopping rate has declined annually on an average .02 pound of hops per barrel of beer for the years 1936-42 inclusive. The rate of decline for 1941-45 inclusive was in excess of this average. It is possible that a further decline in the hopping ratio may occur before the industry stabilizes the ratio of hops to beer. There is reason to believe, however, that the stabilization will occur at a level in excess of that obtaining in 1944-45.

Most brewers are inclined to believe that the consumer preference for the so-called light beers will continue in the postwar era. As conditions now exist, this would mean a hops-beer ratio of .5 pound or less of hops to a barrel of beer. Present practices in the industry

are such that some brewers are using as low as .3 pound of hops to a barrel of beer which would indicate that an acceptable beer can be made with a lower average hopping ratio than that now obtaining in the industry. Some indication of the quantity of hops required to manufacture varying quantities of beer with assumed hops-beer ratios is found in table 6 and figure 5.

As shown below, beer consumption increased from 8 gallons per capita in 1934 (the year following Repeal) to about 13 gallons in 1937, and remained quite stable at 12 to 13 gallons per capita from 1938 to 1941. 1/ During the next four years, consumption increased by more than 50 percent to about 19 gallons per capita. The total consumption of beer in the United States was rather closely related to disposable income of consumers during the 1936-42 period. This is another way of saying that beer sales are highest when the most workers are employed and earning good wages. This is also true for soft-drink beverages. During the war, consumption of beer rose more than the higher incomes alone would suggest. The shortage of consumer goods during the war undoubtedly tended to favor the consumption of beer. The shortage of whisky, wine, and similar liquors may be particularly important in this connection.

Fiscal year	Tax paid withdrawals of fermented malt beverages (thousand barrels) 1/	Population January 1 2/ (thousands)	Consumption per capita 3/ (gallons)	National Income 4/ (billion dollars)
1934	32,266	126,011	7.94	49.5
1935	42,229	126,865	10.32	55.7
1936	48,760	127,720	11.83	64.9
1937	55,392	128,475	13.37	71.5
1938	53,926	129,355	12.92	64.2
1939	51,817	130,406	12.32	70.9
1940	53,014	131,456	12.50	77.6
1941	52,799	132,561	12.35	96.9
1942	60,856	133,688	14.11	122.2
1943	68,636	134,042	15.87	149.4
1944	76,970	133,580	17.86	160.7
1945	79,591	131,664	18.74	157. 5/

1/ Barrels of 31 gallons. Source: Bureau of Internal Revenue.
2/ Excluding members of the armed forces overseas. Source: Census.
3/ Beer shipped to the armed forces overseas is not included in tax paid withdrawals so the population series has been adjusted accordingly.
4/ Calendar years. Reported in Survey of Current Business: 1934-41, in April, 1944; 1942-43, in February 1945; 1944-45 in Sept., 1945.
5/ Preliminary.

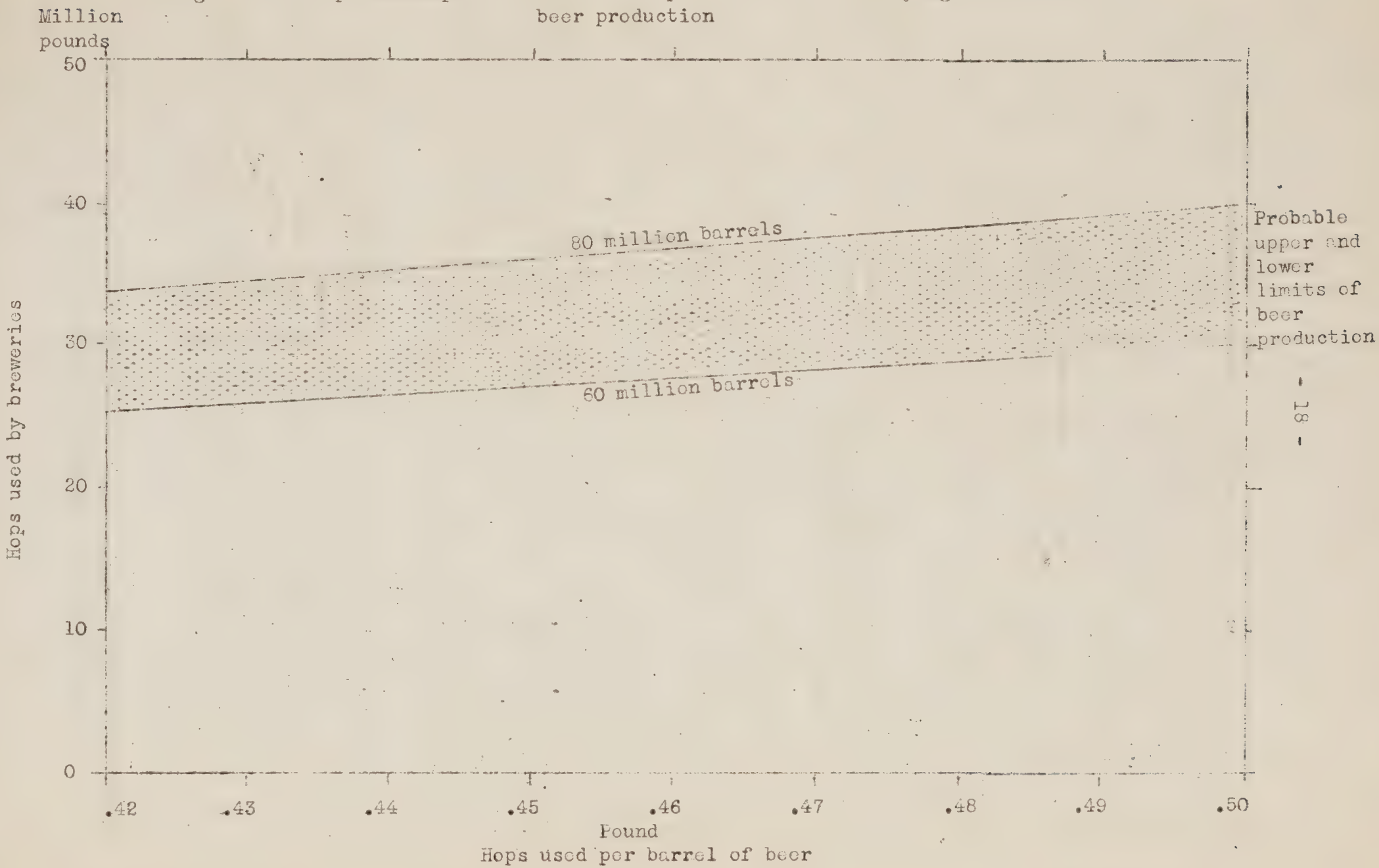
1/ Fiscal years.

Table 6. - Estimated annual consumption of hops at varying levels of beer production and varying hop-beer ratios

Assumed beer production	Assumed ratio: pounds of hops per barrel of beer								
	.42	.43	.44	.45	.46	.47	.48	.49	.50
barrels * (million)	pounds (million)	pounds (million)	pounds (million)	pounds (million)	pounds (million)	pounds (million)	pounds (million)	pounds (million)	pounds (million)
50	21.0	21.5	22.0	22.5	23.0	23.5	24.0	24.5	25.0
55	23.1	23.7	24.2	24.8	25.3	25.9	26.4	27.0	27.5
60	25.2	25.8	26.4	27.0	27.6	28.2	28.8	29.4	30.0
65	27.3	28.0	28.6	29.3	29.9	30.6	31.2	31.9	32.5
70	29.4	30.1	30.8	31.5	32.2	32.9	33.6	34.3	35.0
75	31.5	32.3	33.0	33.8	34.5	35.3	36.0	36.8	37.5
80	33.6	34.4	35.2	36.0	36.8	37.6	38.4	39.2	40.0
85	35.7	36.6	37.4	38.3	39.1	40.0	40.8	41.7	42.5
90	37.8	38.7	39.6	40.5	41.4	42.3	43.2	44.1	45.0
95	39.9	40.9	41.8	42.8	43.7	44.7	45.6	46.6	47.5
100	42.0	43.0	44.0	45.0	46.0	47.0	48.0	49.0	50.0

* 1 barrel = 31 gallons

Figure 5. - Hops consumption related to hops-beer ratio at varying levels of beer production



The permanency of the wartime increase in beer consumption is questionable, and will depend on the amount of income consumers have, the competition from other goods, and the degree to which the wartime changes in eating and drinking habits will have a permanent effect. Shortages of consumer goods relative to demand can be expected to disappear as civilian production increases and backed-up demands are satisfied. If consumer's incomes stayed at the 1944-45 level, total beer consumption would be at least 70 million barrels on the basis of 1936-42 relations between beer consumption and consumer income. In addition, any wartime changes in consumer tastes would increase the demand for beer. If disposable income should fall to the 1941 level, beer consumption would be 10 to 15 million barrels lower. This is the basis for choice of 60 to 80 million barrels as the probable range of beer consumption after the war - from 13 to 17 gallons per capita (figure 5).

Beer consumption and the hops-beer ratio between them determine almost wholly the domestic consumption of hops. Even under maximum assumptions as to these factors, domestic consumption can be expected to fall considerably below domestic production.

The market objective of the brewery industry is around 100 million barrels of beer annually. 1/ If this goal should be reached and if a .5 pound hops-beer ratio obtains, the domestic demand for hops would almost equal the estimated domestic hop production for 1945; but would fall short of the anticipated production after 1946. Any lower consumption of beer or any lower hops-beer ratio would mean that a production equal to that of 1945 would not be absorbed by the market demand and the anticipated increased production would be still further in excess of demand. This is clearly indicated in table 6 and figure 5. It must be recognized, moreover, that during the prewar, post-prohibition years, 1934 to 1940, the annual consumption of imported hops by domestic breweries ranged between 16 and 30 percent of the annual total consumed by breweries. There may readily be a resumption of a substantial demand for foreign grown hops. This is especially true unless domestic growers raise the quality of their product sufficiently to equal the standards obtaining in most imported hops.

In view of the conditions discussed in the foregoing pages, it is reasonable to assume that the consumption of beer will fall somewhat below the maximum reached in 1945. This means, therefore, that the consumption of domestic hops by American brewers could be expected to be considerably less than the estimated 1945 production, and to be still further below the production anticipated after 1946. Unless an export market of sizeable magnitude is developed, the potential consumption of hops by breweries cannot be expected to absorb all of our potential output.

1/ On a per capita basis, this is slightly higher than the record of 21 gallons per capita reported in 1914.

FOREIGN TRADE IN HOPS

Hops are both exported from and imported into the United States. Before World War I, exports were roughly one-fourth of our domestic production and were more than double our imports (figure 6). When the prohibition law cut the domestic consumption of hops, exports absorbed the major part of a diminished production, particularly from 1919 through 1923. Beginning in 1924, however, exports declined regularly each year until 1932 (table 11, p. 38). They have remained relatively low since then, although there was a noticeable increase about 1940.

Prior to World War I, more than 90 percent of our exports went to the United Kingdom (figure 7). Exports to Canada and the Continent of Europe rose during the prohibition period, but they declined again during the 1930's. Exports to Canada rose sharply after 1938, as did those to "other" countries - chiefly Mexico and South American countries which had previously obtained their hops from Germany. The change in destination of exports is reflected in the following data published by the Office of Foreign Agricultural Relations.

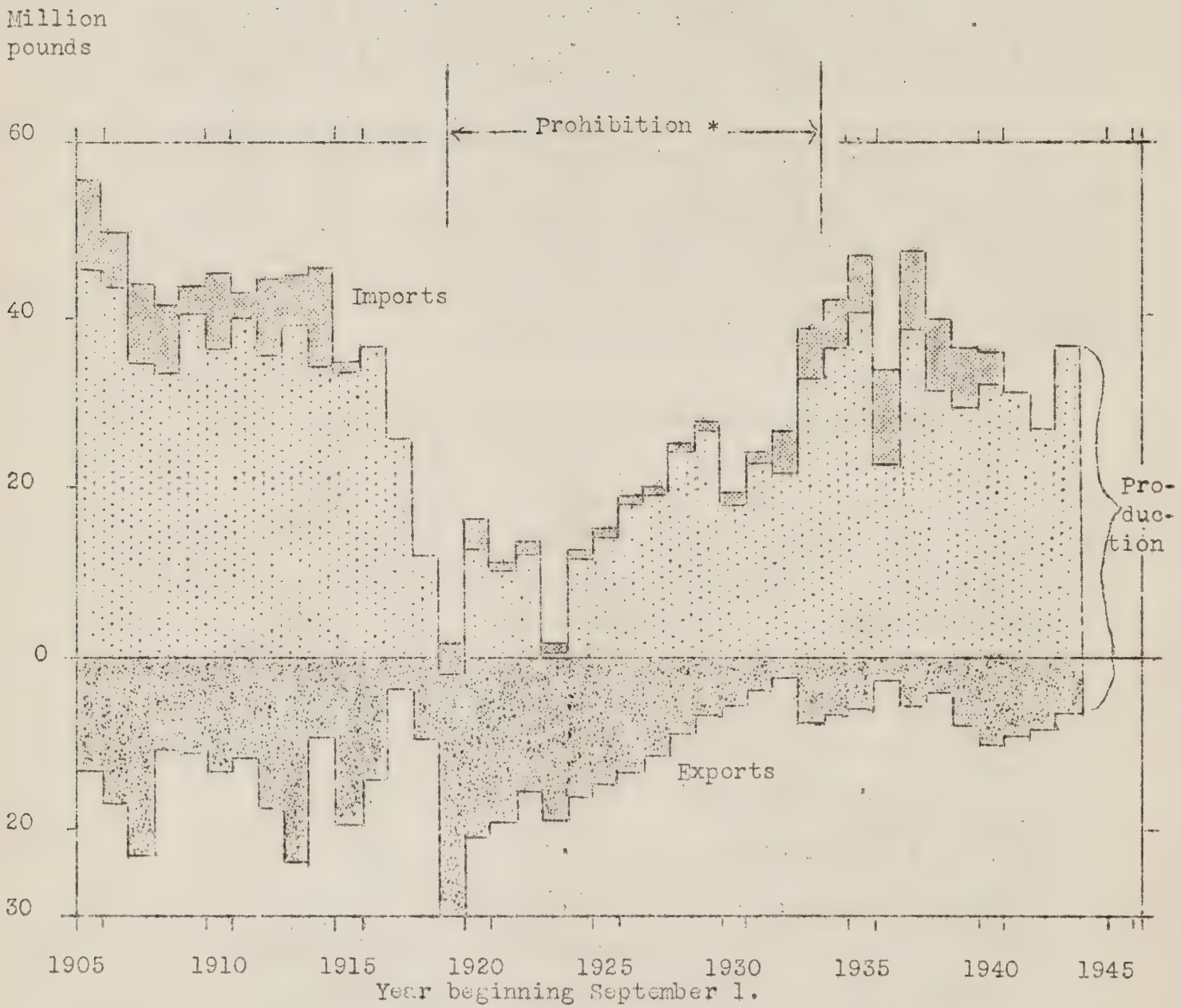
Exports of hops 1938 and 1944 crop years 1/

	Year 1938 pounds	Year 1944 pounds
Europe	156,424	301,923
United Kingdom	2,400,364	30,187
Irish Free State	741,778	399,250
Africa	830	701,939
Asia and Asia Minor	4,400	-
Australia and New Zealand	155,032	-
Canada	299,358	* 2,063,033
Mexico and Central America	289,017	2,404,653
South America	92,649	2,370,600
India and East Indies	18,365	75,327
Japan	2,510	-
Philippine Islands	11,123	-
Others	964	* 339,038
Totals	4,172,814	*8,685,950

1/ Foreign Crops and Markets, Vol. 51, No. 17, P. 244.
* Revised reports since first issuance.

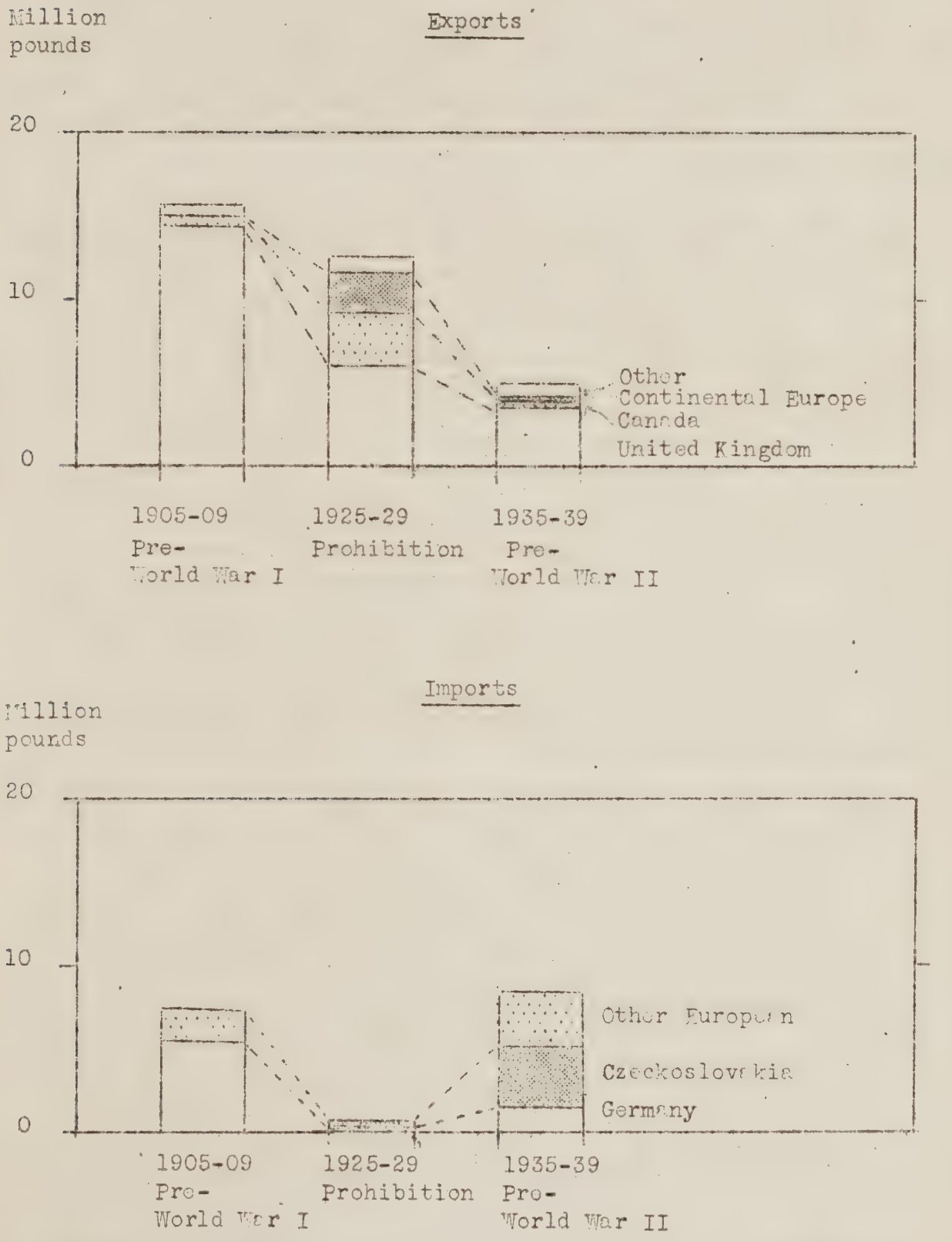
Hops are imported in the United States because many brewers believe that hops from specific countries are essential to the flavor they

Figure 6. - Supply and disposition of hops in the United States, 1905-44



* Including wartime prohibition against use of grain for alcoholic beverages.

Figure 7. - Destination of annual exports and origin of annual imports of hops, United States, for selected 5-year periods



want in the beer they manufacture. This factor is less important now than it was in the prewar era, and particularly during the war years foreign hops have not been available. Imports have been less than exports in all years except 1934, 1936, 1937, 1938, and 1939 (table 12. p. 40.) Imports were especially low during the 1920's, when they fell to about one-half million pounds in some years. With the repeal of the prohibition law, imports rose again to approximately the levels that prevailed before World War I. With the outbreak of World War II, in 1939, imports declined sharply and by 1942 had reached an all-time low. The chief sources of imports into the United States have been areas included in what was called "Greater Germany" - particularly areas in Bavaria and Czeckoslovakia.

Hops are exported from and imported into a number of countries, and some countries both import and export. Of an average annual world production 1/ of hops of more than 130 million pounds in the 1925-29 period, between 50 and 60 million pounds were exported from the country where raised. In the 1930-34 period, world production 1/was about 110 million pounds, of which about 40 million were shipped out of the country where raised. Of the world production in 1930-34, nearly 30 percent was raised in the United States, the leading producer; about 22 percent in England and Wales; 19 percent in Czechoslovakia (as then constituted); 15 percent in Germany, and the rest in numerous other countries, chiefly European. During this period, nearly 40 percent of all exports originated from Czechoslovakia, 17 percent from Germany, 13 percent from the United States, roughly 10 percent each from Yugoslavia and Poland, and the remainder from various nations, chiefly European. Of the total imports in this period, Belgium took about 16 percent, Ireland about 13 percent, Germany and France each about 12 percent, the United Kingdom about 11 percent, the United States about 8 percent, and the rest were imported by a long list of countries. These figures give some idea of the chief prewar producing, exporting, and importing areas.

A crucial question arises, as to the probable volume of United States exports and imports in the postwar years. The answer probably hinges on the condition of European hop yards, as well as upon foreign trade policies. If the major producing European districts are able to turn out a large volume of hops in the next few years, this will be a strong incentive for foreign trade arrangements that will permit them to move. On the other hand, if the productive capacity of European yards has been sharply reduced, there will be little export from those countries for a few years. The conclusion of the authors is that it is not unlikely that hops from the United States will be in fairly active demand by England, Ireland, and South American countries, and perhaps even by some European countries for a year or two, and perhaps longer. It may be possible to retain for a longer period at least a part of the newly acquired increased demand in Mexico and South America.

1/ Excluding the Union of Soviet Socialistic Republics in each period.

It is true that hops were exported from the United States in unusually large volume for 3 or 4 years after World War I. But the demand for these hops was extremely low in the United States because of the prohibition law. Moreover, foreign trade was then much more a matter of private bargaining than it is now; governmental control of foreign trade is now more common. Exports from the United States of the general magnitude of 10 million pounds may be made during the 1946-48 period. If foreign trade relations should be reestablished substantially on the prewar basis, exports after 1948 would certainly be lower.

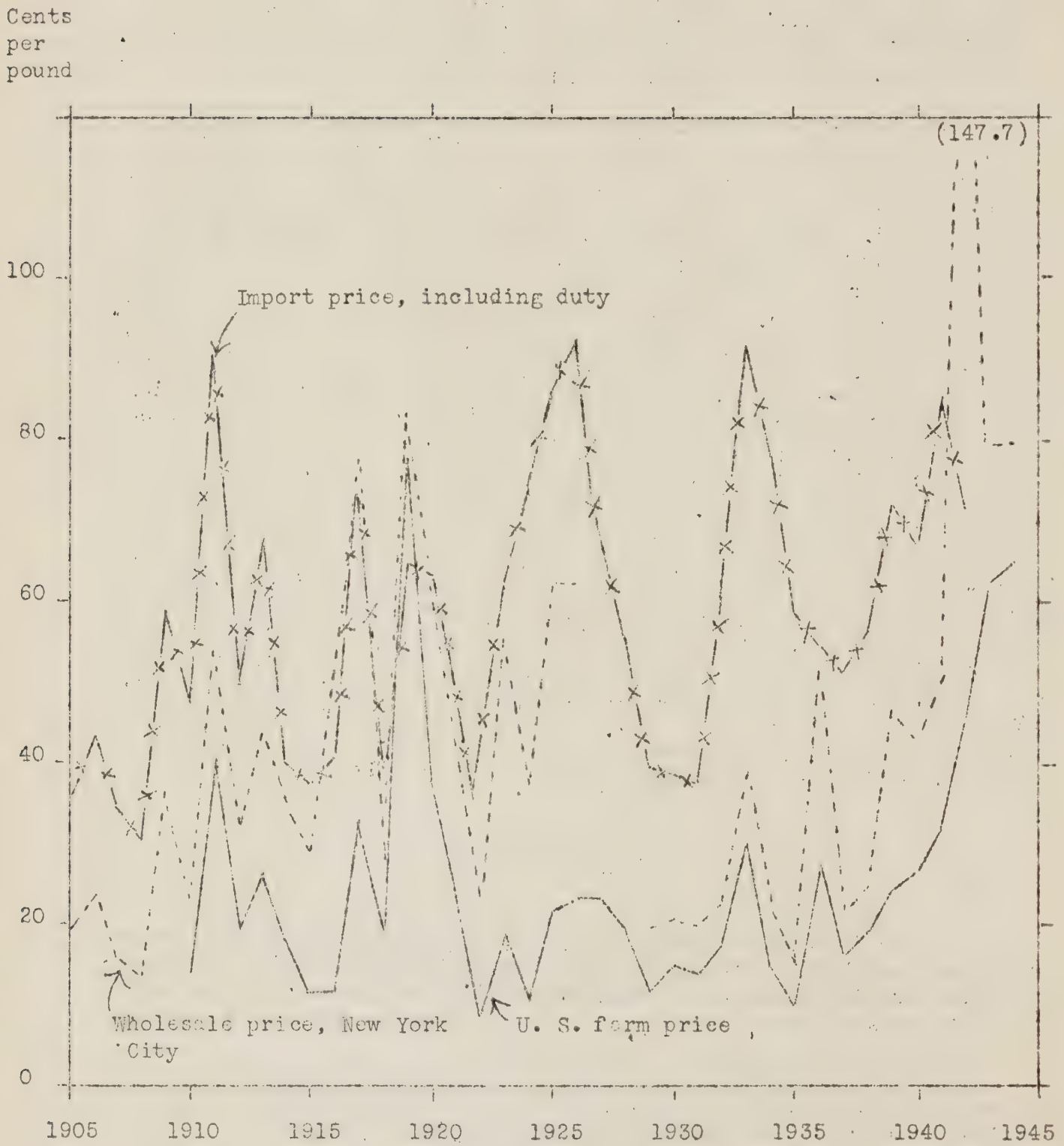
As far as balancing domestic production of hops with the demand for hops, some imports into the United States must be reckoned with because many brewers have a preference for hops grown in certain foreign countries. They believe that the best beer can be produced when foreign hops are used. Since the price of hops is a small factor in the cost of a barrel of beer, there is a consistent demand for some imported hops despite the tariff barrier and the apparent higher net cost per pound. On the whole, however, the volume of such imports will be affected by the same factors that affect foreign trade in hops between other countries - the volume of hops production in the chief European producing districts, and foreign trade policies in general. Even if the situation of the latter 1930's is not approximated, there are almost sure to be some imports of hops. For the next 2 or 3 years, imports are likely to remain small, for the same reasons that exports from the United States may be large. Although the longer-run foreign trade situation is uncertain, the prospects seem to be for a fairly sizeable surplus of exports over imports for 1 to 3 years. After that, the net import-export balance will depend so largely upon the foreign trade policies which may be adopted by various countries that forecasts are extremely hazardous. In view of the great economic and political changes which have taken place in many countries and areas as a result of the war, the postwar pattern of foreign trade in hops could be very different from that of the 1930's. However, the conclusion of the authors is that a large continuing net export of hops seems unlikely as a major outlet for United States hops.

PRICES OF HOPS

In view of the incompleteness of the statistics and the lack of comparability of available statistics on the supply, disposition, and prices of hops, there is no adequate foundation for a conclusive price study. Several facts stand out, however, when the available data are examined.

The trend of the annual average farm price of hops follows closely the longer term trend in the domestic demand or prospective changes in the domestic demand for hops. (figure 8, table 13, p. 42). The precipitious decline in consumption by breweries in 1918 was followed by a rapid price decline that carried from a wartime peak of 77.6 cents in 1919 to a low point of 8.6 cents per pound of hops in 1922. Some of the downward movement was, no doubt, part of the general deflationary

Figure 8. - Price of hops at specified points, 1905-44



condition that hit all farm prices in 1920. On the other hand, the deflation in hop prices was merely furthered by the general movement of farm prices which began two years after prohibition restrictions. The fluctuations in the United States average annual farm price after 1922 appear to reflect the recovery in farm prices generally that followed World War I, between 1922 and 1929, as well as the deflation that came between 1929 and 1933.

The reports on the stocks of hops from 1937 on include the carry-over of breweries as well as those of growers. The peak price of 27.4 cents per pound of hops in 1936 occurred with a carry-over of almost 16 million pounds. The 1937 carry-over reached slightly more than 29 million pounds and the farm price declined to 16.2 cents per pound. Later rises in price from 16.2 cents to 64.6 cents, in 1944, took place when stocks of hops in the hands of growers and breweries were declining each year; in 1944 they were only slightly more than 10 million pounds. The final carry-over figures for 1945 are not available, but preliminary information indicates that they are still low which has encouraged dealers and breweries to bid within legal price ceiling limitations for the available supplies of hops. There is some indication, however, that bidding has lessened materially since the end of the war with Japan.

The harvested acreage of hops fluctuates greatly from year to year (table 7, p. 30). In general, the tendency is for the number of acres harvested to decrease when the carry-over is high and to increase when the carry-over is low. This response of growers to a price-supply situation is made possible by the prior knowledge of dealers' and breweries' contract offerings. If prices are not favorable, the hop acreage may not all be harvested. Then, too, the growers are generally in an economic position to exercise some discretion as to production and marketing of their products. This has been especially true since 1938, at which time the Hop Control Board began to regulate the flow into market channels, thereby influencing market price. The Hop Marketing Agreement expired September 1, 1945. An amendment to the Agricultural Marketing Agreements Act, passed in June 1945, removes any time limitation from future hop marketing agreements. The quantity of hops used in the manufacture of a barrel of beer is chiefly determined by the brewer's formula and not by price. The consumption of hops, therefore, does not respond favorably to lower prices nor adversely to high prices. Furthermore, the cost of the hops used in beer is of little significance in the wholesale and retain price of the product. These conditions of inelastic demand for hops place the growers at a distinct disadvantage if the annual carry-over of hops and the current production get much out of line with brewery requirements.

The net rise of 40.1 cents, or 164 percent, in the average farm price of hops between 1939 and 1944 appears abnormally high, but it was not so high as dealers were willing to pay had not price controls determined the upper price limit. Despite the very substantial increase in price per pound of hops, the quality of the product sold deteriorated

materially during the period of World War II, because of the willingness of buyers to accept almost all hops irrespective of their quality. This fact has importance if the hop growing industry is to adjust to a peacetime marketing program.

As previously mentioned, hop prices were sufficiently high to cause growers to increase production by 10 million pounds between 1939 and 1944. Not only was this increased output utilized, but the available stocks of hops decreased more than 50 percent between 1939 and 1944. This pressure of demand on supply cannot be expected to continue unless (1) there is abnormally high increase in beer consumption and (2) an unusually high net export trade in hops, and (3) a material increase in the hops-beer ratio. But these conditions do not seem likely to occur simultaneously if at all.

The foregoing three fundamental demand conditions that must obtain if hop prices are to remain near their present level, or even at lower but relatively satisfactory levels, are not considered probable at this time. Domestic acreage for harvest probably will not reach its peak until 1947, and full production from new plantings will not be achieved until 1948 or later; by that time foreign grown hops should be available at prices below those now prevailing in the domestic market despite the tariff of 24 cents per pound on hops. Since the cost of hops is a minor factor in the manufacture of beer, the tariff alone has not succeeded in curtailing the importation of foreign grown hops to any great extent.

In view of the probable supply of hops that will be forthcoming in 1946, 1947, and thereafter, and considering the most probable beer consumption together with probable hops-beer ratio, there is a great possibility that the price of hops may weaken considerably in 1946 with a further decline in 1947. The extensive advance contracting for delivery in 1946, 1947, and 1948 was noted in table 4. Prices in these contracts are generally favorable for hops growers, and may serve to steady the market in those years. However, those contracts usually have specifications as to quality, which may be difficult for many growers to meet under present conditions. When hops are in plentiful supply again, dealers and brewers are likely to be more exacting in their requirements.

There are certain competitive forces in the industry that are important as long run price determinants. These follow:

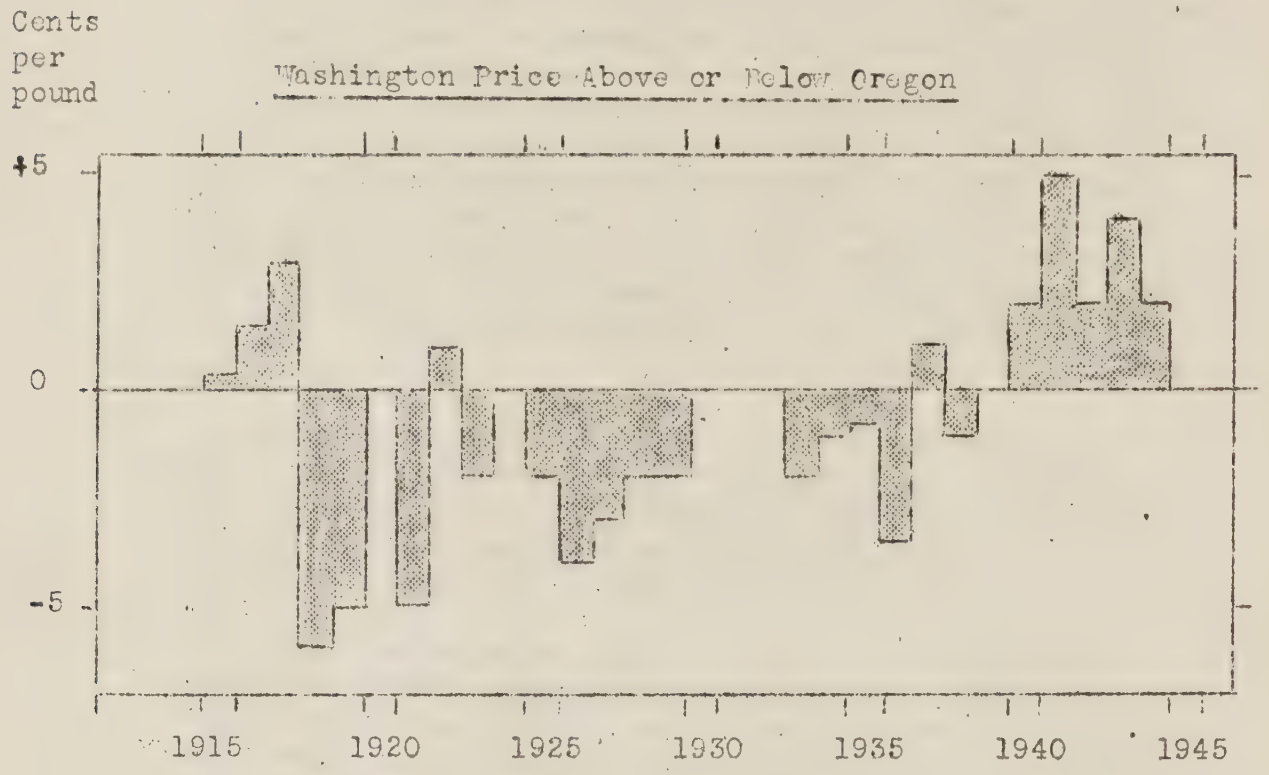
1. Proper grading of hops is essential if the domestic product is to compete with the foreign grown product. Brewers can well afford to pay more for clean foreign hops than for poorly graded domestics. If American hop growers are to meet postwar foreign competition, they must market hops that are (a) free from leaves and stems, (b) free from disease, (c) relatively unshattered in handling, and (d) properly dried.

2. Many brewers are expressing a preference for hops of lower seed content than has been customary in the past. The effect of seed content on average hops prices is fairly well indicated by a comparison of average farm prices to California, Oregon, and Washington growers. The acreage of hops in Washington has more than doubled since 1939, and more than two-thirds of the 1944 marketing from Washington showed less than 6 percent seed content. This lower seed content in Washington hops accounts in a large measure for the price differential that has favored Washington growers since 1940, inasmuch as the legal price differential can amount to approximately 12 cents per pound of hops. (figure 9).

3. Hop harvesting methods are in the process of change. The mechanization of the harvesting operation by the use of field machine pickers has started in several hops yards. This mechanization has tended to lower unit harvesting costs and make easier the standardization of product quality.

4. The development and use of uniform standards for grading hops would do much to eliminate some of the apparently unaccountable price fluctuations in grower-dealer-brewery transactions. Material progress has been made toward developing uniform grading standards as a result of the research sponsored by the Brewers' Hop Research Institute at the Oregon State College. This work is now proceeding at the College and further progress is likely.

Figure 9. - Comparisons of farm price of hops, Washington, Oregon, and California, 1915-44



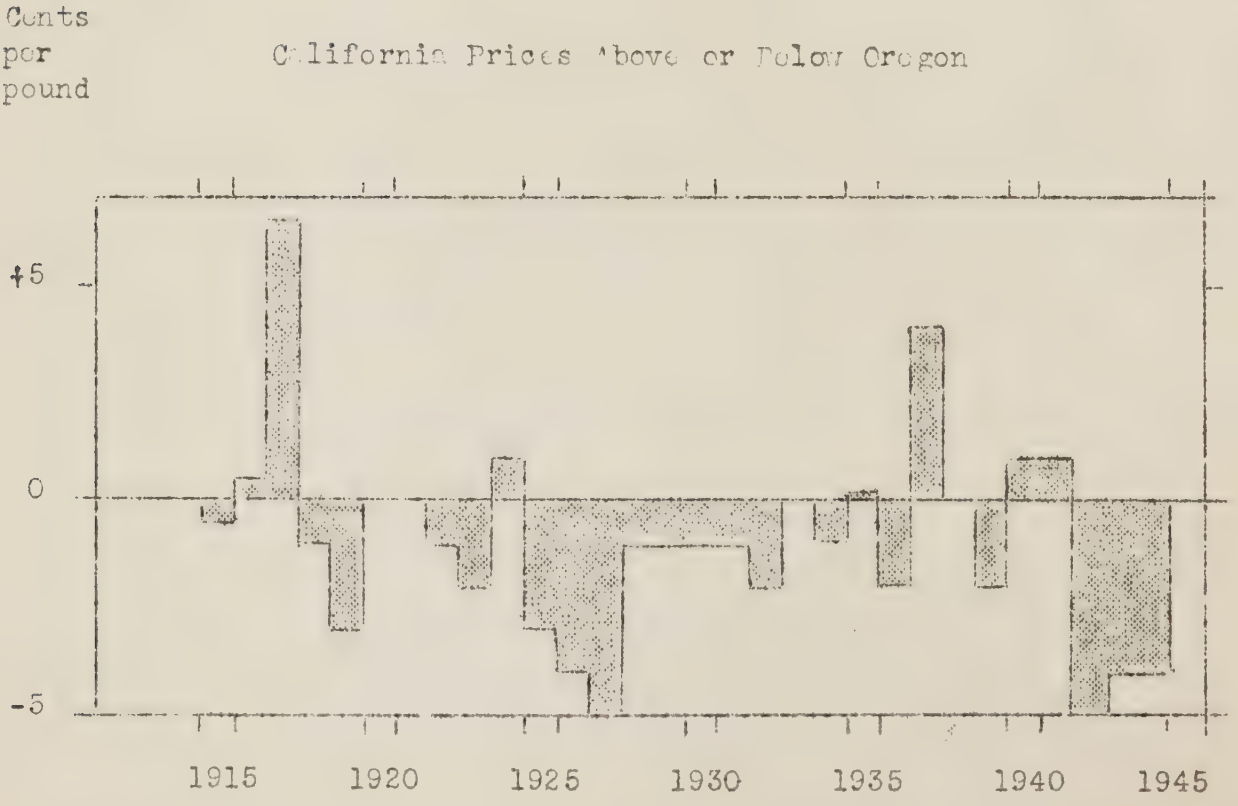


Table 7. - Acreage of hops harvested, by States, 1915-45
(acres)

Year	Washington	Oregon	California	Total 3 states
1915	4,530	20,000	14,350	38,880
1916	4,500	20,000	14,400	38,900
1917	3,500	10,000	11,900	25,400
1918	3,100	8,000	11,000	22,100
1919	2,000	8,000	11,000	21,000
1920	3,000	11,000	12,000	26,000
1921	3,000	12,000	12,000	27,000
1922	2,400	12,000	9,000	23,400
1923	1,890	11,550	5,000	18,440
1924	2,350	12,000	6,000	20,350
1925	2,350	13,000	5,000	20,350
1926	2,400	13,000	5,400	20,800
1927	2,600	16,000	6,000	24,600
1928	3,200	17,000	6,000	26,200
1929	2,900	17,000	4,500	24,400
1930	2,200	14,000	3,300	19,500
1931	2,200	15,500	3,700	21,400
1932	2,500	15,500	4,000	22,000
1933	4,900	19,000	6,400	30,300
1934	6,300	23,000	7,800	37,100
1935	6,000	26,000	7,100	39,100
1936	4,500	21,000	5,500	31,000
1937	5,000	22,300	7,000	34,300
1938	5,000	19,800	6,700	31,500
1939	4,900	19,300	6,800	31,000
1940	6,000	19,600	7,200	32,800
1941	7,200	20,000	7,600	34,800
1942	7,600	19,300	7,700	34,600
1943	7,800	16,500	7,900	32,200
1944	9,700	18,500	8,400	36,600
1945	11,700	19,900	9,000	40,600

Sources: 1915-1941; U. S. Bureau of Agricultural Economics, Crop Reporting Board, Hops: Revised Estimates of Acreage, Yield, and Production 1915-1941, mimeo. October 1943.

1942-1945; U. S. Office of Marketing Services, Hop Market Review, San Francisco, California, January 7, 1944, January 5, 1945, and August 3, 1945.

Table 8. - Yield of hops per acre by states, 1905-45

(pounds)

Year	Washington	Oregon	California	Total 3 states	New York	Wisconsin	Total U. S.
1905	1,480	1,070	970		545	-	1,005
1906	1,240	1,150	1,275		650	-	1,101
1907	1,425	1,050	1,460		510	-	1,114
1908	1,375	950	1,400		600	-	1,065
1909	1,400	850	1,300		665	400	992
1910	1,370	990	1,550		775	550	1,130
1911	1,300	825	1,300		500	1,000	960
1912	1,450	1,350	1,450		480		1,142
1913	1,615	1,250	1,600		550		1,150
1914	1,480	950	1,700		450		985
1915	1,648	1,050	1,495	1,284	530		1,187
1916	1,515	950	1,547	1,236	500		1,153
1917	1,657	500	1,320	1,044	640		983
1918	1,370	435	1,136	915	330		724
1919	1,340	850	1,650	1,316	690		1,228
1920	1,910	725	1,575	1,254	950 1/		1,224
1921	1,700	770	1,250	1,087			
1922	1,410	800	1,640	1,186			
1923	2,123	722	1,480	1,071			
1924	1,817	1,150	1,600	1,360			
1925	2,116	1,200	1,600	1,404			
1926	2,380	1,300	1,650	1,515			
1927	1,867	994	1,650	1,246			
1928	2,020	1,000	1,580	1,257			
1929	1,750	1,085	2,150	1,360			
1930	1,660	1,025	1,650	1,202			
1931	1,760	1,096	1,500	1,234			
1932	1,775	840	1,650	1,094			
1933	1,600	1,135	1,700	1,330			
1934	1,905	900	1,440	1,184			
1935	1,819	992	1,370	1,188			
1936	1,617	530	1,250	816			
1937	1,757	1,100	1,520	1,281			
1938	1,935	830	1,370	1,120			
1939	1,880	900	1,600	1,208			
1940	1,950	1,035	1,400	1,282			
1941	1,850	840	1,350	1,160			
1942	1,551	680	1,330	1,016			
1943	1,960	880	1,600	1,318			
1944	1,750	925	1,620	1,303			
1945 2/	1,880	900	1,650	1,349			

Footnotes on next page.

Table 8. - Yield of hops per acre by states, 1905-45 (cont'd.)

1/ Although New York acreage is not reported subsequent to 1920, a small acreage has continued to exist there.
2/ Indicated.

Sources: 1905-1912; U. S. Department of Agriculture, Crop Reporter, October issues.
1913; U. S. Department of Agriculture, Agricultural Outlook, October 16, 1914.
1914; U. S. Department of Agriculture, Monthly Crop Reporter, October 1915.
1915-1941; Pacific Coast states from U. S. Bureau of Agricultural Economics, Crop Reporting Board,
Hops; Revised Estimates of Acreage, Yield, and Production 1915-1941, Mimeo. October 1943. New York and U. S. from University of California - College of Agriculture - Agricultural Extension Service, Statistics Presented in Connection with a Proposed Marketing Agreement for Hops Produced in California, Oregon, and Washington, by William C. Ockey, Dallas W. Smythe, and F. R. Wilcox, January 1935, page 10.
1942-1945; U. S. Office of Marketing Services, Hop Market Review, San Francisco, California, January 7, 1944, January 5, 1945, and August 3, 1945.

Table 9. - Production of hops by States, 1905-45

(1,000 pounds)

Year	Washington	Oregon	California	Total 3 states	Other	Total U. S. 1/
1905	9,750	22,191	14,235	46,176	9,360	55,536
1906	8,775	23,985	15,520	48,280	12,006	60,286
1907	7,000	23,000	15,000	45,000	9,000	57,510
1908	3,000	16,000	12,000	31,000	8,000	43,900
1909	3,000	15,000	13,000	31,000	9,000	50,697
1910	4,000	18,000	13,000	35,000	9,000	49,634
1911						51,672
1912						53,371
1913						62,899
1914						43,415
1915	7,466	21,000	21,460	49,926	3,060	52,986
1916	6,818	19,000	22,277	48,095	2,500	50,595
1917	5,800	5,000	15,708	26,508	2,880	29,388
1918	4,247	3,480	12,500	20,227	1,254	21,481
1919	2,680	6,800	18,150	27,630	690	28,320
1920	5,730	7,975	18,900	32,605	950	33,555
1921	5,100	9,240	15,000	29,340		29,340
1922	3,384	9,600	14,760	27,744		27,744
1923	4,012	8,339	7,400	19,751		19,751
1924	4,270	13,800	9,600	27,670		27,670
1925	4,973	15,600	8,000	28,573		28,573
1926	5,712	16,900	8,910	31,522		31,522
1927	4,854	15,904	9,900	30,658		30,658
1928	6,464	17,000	9,480	32,944		32,944
1929	5,075	18,445	9,675	33,195		33,195
1930	3,652	14,350	5,445	23,447		23,447
1931	3,872	16,988	5,550	26,410		26,410
1932	4,438	13,020	6,600	24,058		24,058
1933	7,840	21,565	10,880	40,285		40,285
1934	12,002	20,700	11,232	43,934		43,934
1935	10,914	25,792	9,727	46,433		46,433
1936	7,276	11,130	6,875	25,281		25,281
1937	8,785	24,530	10,640	43,955		43,955
1938	9,675	16,434	9,179	35,288		35,288
1939	9,212	17,370	10,880	37,462		37,462
1940	11,700	20,286	10,080	42,066		42,066
1941	13,320	16,800	10,260	40,380		40,380
1942	11,788	13,124	10,241	35,153		35,153
1943	15,288	14,520	12,640	42,448		42,448
1944	16,975	17,112	13,608	47,695		47,695
1945 2/	21,990	17,910	14,850	54,750		54,750

Footnotes on next page.

Table 9. - Production of hops by States, 1905-45 (cont'd.)

1/ Includes the following quantities not available for marketing because of economic conditions and the marketing agreement allotments (1,000 pounds): 1935, 5,436; 1937, 4,365; 1938, 3,140; 1939, 2,813.
2/ Indicated.

Sources: 1905-1914; U. S. Department of Agriculture Yearbooks, 1908-1916. U. S. totals, 1907-1910 obtained from later yearbooks than those in which state figures were given. These later yearbooks give no state figures.
For California only, California Board of Agriculture, Statistical Report 1915, page 84, California crop, (1,000 pounds): 1905, 13,095; 1906, 15,520; 1907, 16,072; 1908, 13,260; 1909, 12,765; 1910, 13,135; 1911, 16,095; 1912, 21,645; 1913, 21,922; 1914, 20,350.
1915-1941; individual states from U. S. Bureau of Agricultural Economics, Crop Reporting Board, Hops: Revised Estimates of acreage, Yield, and Production 1915-1941, mimeo. October 1943. U.S. totals from U. S. Department of Agriculture, Agricultural statistics, 1942, page 365 and 1944, page 280.
1942-1945; U. S. Office of Marketing Services, Hop Market Review, San Francisco, California, January 7, 1944, January 5, 1945, and August 3, 1945.

Table 10. - Supply and disposition of hops in the United States, 1905-45

(Thousand pounds)

Year 1/	Stocks 2/ Sept. 1	Harvested production	Total supply	Stocks following Sept. 1	Total movement out of growers' hands 2/	Exports	Movement from growers to dom. trade 2/	Imports	Dom. trade supply excl. trade carry in	Consumption by breweries 3/
	1	2	3	4	5	6	7	8	9	10
1905-06		55,536				13,027		10,114		41,620
1906-07		60,286				16,810		6,212		44,295
1907-08		57,510				22,920		8,493		42,988
1908-09		43,900				10,447		7,387		40,814
1909-10		50,697				10,589		3,201		43,294
1910-11		49,634				13,477		8,520		45,069
1911-12		51,672				11,941		2,993		42,437
1912-13		53,371				17,758		8,527		44,238
1913-14		62,899				23,902		5,418		43,988
1914-15		43,415				9,372		11,545		38,839
1915-16		52,986				19,592		706		37,452
1916-17		50,595				14,252		201		41,959
1917-18		29,388				3,654		121		33,481
1918-19		21,481				9,545		4/		13,925
1919-20		28,320				30,266		3,876		6,441
1920-21	2,580	33,555	36,135	6,800	29,335	20,818	8,517	3,671	12,188	5,989
1921-22	6,800	29,340	36,140	8,700	27,440	19,144	8,296	975	9,271	4,453
1922-23	8,700	27,744	36,444	11,000	25,444	15,659	9,785	1,368	11,153	4,556
1923-24	11,000	19,751	30,751	1,800	28,951	19,007	9,944	574	10,518	3,815
1924-25	1,800	27,670	29,470	1,300	28,170	16,032	12,138	482	12,620	5/ 3,256

Continued.

Table 10. - Supply and disposition of hops in the United States, 1905-45 (Cont'd.)

(Thousand pounds)

Year 1/	Stocks 2/ Sept. 1	Harvested production	Total supply	Stocks following Sept. 1	Total movement out of growers' hands 2/	Exports	Movement from growers to dom. trade 2/	Imports	Dom. trade supply excl. trade carry in	Consumption by breweries 3/
	1	2	3	4	5	6	7	8	9	10
1925-26	1,300	28,573	29,873	800	29,073	14,392	14,681	569	15,250	5/ 3,426
1926-27	800	31,522	32,322	1,800	30,522	13,480	17,042	471	17,513	5/ 3,149
1927-28	1,800	30,658	32,458	2,000	30,458	11,536	18,922	733	19,655	5/ 3,071
1928-29	2,000	32,944	34,944	5,700	29,244	8,854	20,390	688	21,078	2,735
1929-30	5,700	33,195	38,895	6,512	32,383	6,725	25,658	6/ 944	26,602	2,627
1930-31	6,512	23,447	29,959	2,328	27,631	5,552	22,079	1,039	23,118	2,197
1931-32	2,328	26,410	28,738	2,536	26,202	3,801	22,401	1,294	23,695	1,841
1932-33	2,536	24,058	26,594	1,789	24,805	2,444	22,361	4,962	27,323	7,767
1933-34	1,789	40,285	42,074	8,658	33,416	7,700	25,716	7/ 5,761	31,477	26,235
1934-35	8,658	43,934	52,592	16,061	36,531	6,772	29,759	5,257	35,016	31,773
1935-36	16,061	46,433	62,494	15,825	46,669	6,184	40,485	6/ 6,535	47,020	33,316
1936-37	15,825	25,281	41,106	29,294	11,812	2,719	9,093	11,026	20,119	37,005
1937-38	29,294	43,955	73,249	25,173	48,076	5,784	42,292	9,189	51,481	34,875
1938-39	25,173	35,288	60,461	27,069	33,392	4,183	29,209	8,053	37,262	32,746
1939-40	27,069	37,462	64,531	22,124	42,407	7,991	34,416	6,814	41,230	31,927
1940-41	22,124	42,066	64,190	20,008	44,182	10,030	34,152	3,736	37,888	31,155
1941-42	20,008	40,380	60,388	18,892	41,496	9,459	32,037	154	32,191	34,512
1942-43	18,892	35,153	54,045	10,735	43,310	8,673	34,637	111	34,748	34,833
1943-44	10,735	42,448	53,183	10,110	43,073	6,311	36,762	73	36,835	36,515
1944-45	10,110	47,695	57,805							
1945-46		8/ 54,750								

Continued

Table 10. - Supply and disposition of hops in the United States, 1905-45 (Cont'd.)

1/ September to August year except column 10 which is July to June year.
2/ Prior to 1937, the Sept. 1 stocks included only those in growers' hands; from 1937 to date, stocks in dealers' hands and in brewers' hands are also included and these have greatly exceeded the growers' stocks. On September 1, 1943, no stocks were reported in hands of growers.
3/ 1920 to 1931 represent hops used to make cereal beverages containing less than 0.5 percent of alcohol by volume; 1932 includes 867,057 pounds of hops used to make cereal beverages containing less than 0.5 percent of alcohol by volume and 6,900,263 pounds fermented malt liquor containing not more than 3.2 percent alcohol by weight; 1933 to date, used for fermented liquor.
4/ Less than 500 pounds.
5/ Not including 57,936 pounds in 1924, 71,508 pounds in 1925, 960 pounds in 1926, and 6,294 pounds in 1927 used in the manufacture of distilled spirits.
6/ Includes hop extract and lupulin, 1930-35.
7/ Beginning 1933 imports for consumption.
8/ Indicated.

Sources: Col. 1: 1920-21 to 1928-29; U. S. Department of Agriculture, Agricultural Adjustment Administration, Division of Marketing and Marketing Agreements, Preliminary Economic Statement Relating to Hops Produced in Oregon, California, and Washington, June 1938, page 6. 1929-30 to 1943-44; U. S. Department of Agriculture, Agricultural Statistics, 1944, page 280. 1944-45; U. S. Office of Marketing Services, Hop Market Review, San Francisco, August 3, 1945.
Col. 2: from Table
Col. 3: Col. 1 plus col. 2.
Col. 4: Same as col. 1.
Col. 5: Col. 3 minus col. 4.
Col. 6 and 8: 1905-06 to 1909-10 are July-June years, from U. S. Department of Agriculture, Monthly Crop Report, November 1915, page 75. 1910-11 to 1939-40; U. S. Department of Agriculture, Agricultural Statistics, 1942, page 365, and 1944, page 280. 1940-41 to 1943-44; U. S. Office of Marketing Services, Hop Market Review, San Francisco, August 3, 1945.
Col. 7: Col. 5 minus col. 6.
Col. 9: Col. 7 plus col. 8.
Col. 10: 1905-06 to 1909-10; U. S. Department of Agriculture, Monthly Crop Report, November 1915, page 75. 1910-11 to 1933-34; U. S. Department of Agriculture, Agricultural Statistics, 1942, page 365, and 1944, page 280. 1934-35 to 1944-45; U. S. Office of Marketing Services, Hop Market Review, San Francisco, July 6, 1945.

Table 11.- Exports of hops from the United States, by country of destination, 1905-42

(1,000 pounds)

Year 1/	United Kingdom	Continental Europe	Canada	All other	Total
1905	13,943	3	438	475	14,859
1906	11,948	4	380	695	13,027
1907	15,565	30	571	644	16,810
1908	21,748	32	681	459	22,920
1909	9,219	-	702	526	10,447
1910	9,530	20	634	405	10,589
1911	11,782	10	635	678	13,105
1912	10,463	35	1,326	367	12,191
1913	15,409	28	1,036	1,118	17,591
1914	22,220	154	1,213	676	24,263
1915	13,824	19	1,071	1,296	16,210
1916	19,703	91	626	1,990	22,410
1917	824	162	801	3,038	4,825
1918	76	72	749	2,773	3,670
1919	12,524	1,552	2,493	4,229	20,798
1920	21,422	29	1,969	2,204	25,624
1921	13,376	672	2,960	1,452	18,460
1922	10,586	1,233	1,867	1,196	14,882
1923	6,246	8,692	4,008	1,095	20,041
1924	5,116	7,672	2,762	1,841	17,391
1925	8,223	6,754	4,118	1,560	20,655
1926	5,015	3,814	2,757	1,247	12,833
1927	8,276	1,587	3,132	1,124	14,119
1928	4,299	153	2,777	757	7,986
1929	4,643	148	2,461	425	7,677
1930	4,758	162	2,507	213	7,640
1931	3,094	64	508	131	3,797
1932	2,566	57	270	114	3,007
1933	5,452	256	668	351	6,727
1934	4,520	338	825	320	6,003
1935	4,541	303	907	470	6,221
1936	2,539	79	473	333	3,424
1937	4,852	87	388	341	5,668
1938	3,748	127	519	428	4,822
1939	1,734	154	292	2,502	4,682
1940	3,251	139	1,192	5,067	9,649
1941	476	93	1,942	7,332	9,843
1942	364	124	3,544	4,508	8,540

Continued next page.

Table 11.- Exports of hops from the United States, by country of destination, 1905-42 (Cont'd.)

1/ Years ending June 30, 1910-1917. Calendar years thereafter.

Sources: 1915-1932; University of California - College of Agriculture - Agricultural Extension Service, Statistics Presented in Connection with a Proposed Marketing Agreement for Hops Produced in California, Oregon, and Washington, by William C. Ockey, Dallas W. Smythe, and F. R. Wilcox, January 1935, page 16. 1905-1914 and 1933-1942; U. S. Department of Commerce, Foreign Commerce and Navigation of the U. S., annual issues.

Table 12.- Imports of hops into the United States by country of origin, 1905-42

(pounds)

Year 1/	Czecho-slovakia 2/	Germany	Other European	All other	Total
1905		3,527,303	811,847	229	4,339,379
1906		7,900,735	2,201,141	12,113	10,113,989
1907		4,554,883	1,657,003	7	6,211,893
1908		5,912,660	2,578,531	2,074	8,493,265
1909		4,937,580	2,445,673	3,321	7,386,574
1910		2,059,484	1,141,027	49	3,200,560
1911		5,249,130	3,300,764	7,637	8,557,531
1912		1,770,620	1,219,205	1,300	2,991,125
1913		5,044,424	3,449,707	13	8,494,144
1914		2,838,370	2,500,723	12,932	5,382,025
1915		5,370,588	6,277,123	3,821	11,651,332
1916		358,564	317,140	-	675,704
1917		14,000	221,064	1,785	236,849
1918		-	121,211	77	121,288
1919		153,379	314,054	-	467,433
1920	1,705,353	1,374,647	2,792,430	77,068	5,949,499
1921	367,820	812,196	420,367	28,546	1,628,929
1922	723,572	456,950	19,041	1,380	1,200,943
1923	632,585	327,993	13,790	43,527	1,017,865
1924	327,719	50,125	26,685	1,721	406,250
1925	404,643	99,341	73,773	14,701	592,458
1926	313,081	211,268	42,874	551	567,744
1927	324,629	213,894	15,590	-	554,113
1928	317,810	186,223	75,480	1,472	580,985
1929	376,870	367,571	7,336	12,553	764,630
1930 3/	451,218	622,547	15,380	9,498	1,098,643
1931 3/	291,854	772,107	12,478	900	1,077,339
1932 3/	322,694	922,693	53,835	557	1,299,779
1933 3/	1,834,205	3,613,639	421,750	67,912	5,937,506
1934	2,195,161	3,257,885	647,988	3,959	6,104,973
1935	2,523,932	1,853,653	867,723	2,900	5,248,208
1936	4,026,875	2,344,297	2,521,889	20,717	8,913,778
1937	5,369,679	1,731,519	2,907,613	11,957	10,020,768
1938	5,099,455	348,971	3,773,351	370	9,222,156
1939	1,111,617	1,038,627	5,940,353	60,622	8,190,219
1940	-	1,250,192	2,347,237	13,418	3,610,847
1941	-	-	3,535,060	27,614	3,562,674
1942	10,482	-	120,613	91,017	222,112

Footnotes on next page.

Table 12. - Imports of hops into the United States by country of origin, 1905-42 (cont.)

1/ Years ending June 30, 1910-1917. Calendar years thereafter.
2/ Included in other European countries, 1905-1919.
3/ Includes hop extract and lupulin 1930-1933.

Sources: 1910-1931; U. S. Department of Agriculture, Agricultural Adjustment Administration - Division of Marketing and Marketing Agreements, Preliminary Economic Statement Relating to Hops Produced in Oregon, California, and Washington, June 1938, Table VIII.
1905-1909 and 1932-1942; U. S. Department of Commerce, Foreign Commerce and Navigation of the U. S., annual issues.

Table 13.- Price of hops at specified points, and tariffs, 1905-44

(cents per pound)

Year	Farm price 1/				Wholesale Oct.-Nov. averages		Import price without duty 4/	Tariff rate	Import price including duty
	Washington	Oregon	California	United States	New York prime to choice 2/	Chicago, 1905-1913 San Francisco, 1914-1939 3/			
	1	2	3	4	5	6	7	8	9
1905					19.3	13.0	23.5	12	35.5
1906					23.8	15.8	31.6	12	43.6
1907					16.0	10.5	22.1	12	34.1
1908					13.5	10.0	18.1	12	30.1
1909		5/ 22.6			36.8	26.5	46.9	12	58.9
1910		5/ 13.9		6/ 14.0	22.3	16.3	31.6	16	47.6
1911		5/ 41.8		6/ 40.5	54.8	47.3	74.6	16	90.6
1912		5/ 18.3		6/ 19.8	31.8	22.8	33.6	16	49.6
1913		5/ 22.8		6/ 26.4	44.0	27.0	51.8	16	67.8
1914		5/ 14.9		6/ 18.1	34.8	13.3	23.8	16	39.8
1915	11.3	11.0	10.5	11.7	29.0	12.8	21.4	16	37.4
1916	11.5	10.0	10.5	12.0	52.5	11.8	25.0	16	41.0
1917	27.0	24.0	31.0	33.3	79.0	31.2	59.7	16	75.7
1918	15.0	21.0	20.0	19.3	28.2	-	23.4	16	39.4
1919	75.0	80.0	77.0	77.6	83.9	81.2	48.8	16	64.8
1920	35.0	35.0	35.0	35.7	57.5	57.1	47.5	16	63.5
1921	20.0	25.0	25.0	24.1	42.3	19.5	38.2	16	54.2
1922	10.0	9.0	8.0	8.6	23.0	12.5	19.8	16	35.8
1923	18.0	20.0	18.0	18.8	55.8	27.8	38.8	24	62.8
1924	10.0	10.0	11.0	10.3	37.1	14.2	50.3	24	74.3

Continued

Table 13.- Price of hops at specified points, and tariffs, 1905-44 (cont.)

(cents per pound)

Year	Farm price 1/				Wholesale Oct.-Nov. averages		Import price without duty 4/	Tariff rate	Import price including duty
	Washington	Oregon	California	United States	New York prime to choice 2/	Chicago, 1905-1913 San Francisco, 1914-1939 3/			
	1	2	3	4	5	6	7	8	9
1925	21.0	23.0	20.0	21.8	62.4	13.5	61.9	24	85.9
1926	21.0	25.0	21.0	23.1	62.1	25.0	68.8	24	92.8
1927	22.0	25.0	20.0	22.9	-	22.5	44.3	24	68.3
1928	18.0	20.0	19.0	19.3	-	22.5	30.9	24	54.9
1929	10.0	12.0	11.0	11.4	19.7	17.2	15.7	24	39.7
1930	15.0	15.0	14.0	14.8	20.5	7/ 12.0	14.8	24	38.8
1931	14.0	14.0	13.0	13.8	20.1	13.0	13.5	24	37.5
1932	18.0	18.0	16.0	17.5	22.9	12.8	37.0	24	61.0
1933	32.0	30.0	30.0	30.4	39.1	34.6	68.0	24	92.0
1934	14.0	15.0	14.0	14.5	22.5	22.5	54.0	24	78.0
1935	9.2	9.9	10.0	9.8	14.9	12.4	34.4	24	58.4
1936	25.5	29.0	27.0	27.4	51.8	33.6	30.6	24	54.6
1937	16.0	15.0	19.0	16.2	21.6	13.1	27.7	24	51.7
1938	19.0	20.0	20.0	19.7	25.4	16.2	32.9	24	56.9
1939	25.0	25.0	23.0	24.5	46.7	26.0	48.1	24	72.1
1940	28.0	26.0	27.0	26.8	43.1		43.4	24	67.4
1941	35.0	30.0	31.0	31.9	51.2		61.6	24	85.6
1942	48.0	46.0	41.0	45.2	147.7		47.7	24	71.7
1943	66.0	62.0	58.0	62.2	80.0			24	
1944	8/ 67.0	8/ 65.0	8/ 61.0	8/ 64.6	80.0			24	

Footnotes on next page.

Table 13.- Price of hops at specified points, and tariffs, 1905-44 (cont.)

1/ Farm price of December 1, for years through 1931. Season average price thereafter.
2/ 1933-1938 prices include "fair to prime," "medium to prime," and "common to prime" as well as "choice." 1939-1944 prices include "clusters," "seedless," and "semi-seedless."
3/ Old and new crop.
4/ July - June year.
5/ Weighted annual average prices paid growers; weights: 75 percent for the months of September, October, and November; 15 percent for December, January, and February; 10 percent for March, April, and May.
6/ Average farm price for months of September-December, 1910-1914.
7/ Estimate.
8/ Preliminary.

Sources: Cols. 1-4: 1909-1933; University of California - College of Agriculture - Agricultural Extension Service, Statistics presented in Connection with a Proposed Marketing Agreement for Hops Produced in California, Oregon, and Washington, by William C. Ockey. Dallas W. Smythe, and F. R. Wilcox, January 1935, page 17. 1934-1936; U. S. Department of Agriculture Yearbooks of Agriculture, and Agricultural Statistics, annuals. 1937-1941; U. S. Office of Marketing Services, Hop Market Review, San Francisco, California, October 15, 1943. 1942; U. S. Department of Agriculture, Agricultural Statistics 1944, page 281. 1943-1944; U. S. Bureau of Agricultural Economics, Season Average Prices and Value of Production, 1943 and 1944, page 11.
Cols. 5 and 6: 1905-1929; Agricultural Experiment Station, Oregon State Agricultural College, An Economic Study of the Hop Industry in Oregon, Station Bulletin 288, June 1931, page 76. 1930-1932; University of California - College of Agriculture - Agricultural Extension Service, Statistics Presented in Connection with a Proposed Marketing Agreement for Hops Produced in California, Oregon, and Washington, by William C. Ockey, Dallas W. Smythe, and F. R. Wilcox, January 1935, page 19. 1934-1944; New York prices - Producers Price Current, New York. San Francisco prices - Daily Commercial News, San Francisco, (not quoted since 1939).
Col. 7: 1905-1929; same as columns 5 and 6. 1930-1940; U. S. Bureau of Foreign and Domestic Commerce, Monthly Summary of Foreign Commerce of the U. S., June and December issues. Computed from total value and net weight figures. 1942-1943; U. S. Office of Foreign Agricultural Relations, Foreign Crops and Markets, Monthly Supplement, August 21, 1943.
Col. 8: Comparison of the Tariff Acts of 1897, 1909, 1913, and 1922.
Col. 9: Col. 7 plus col. 8.